

- R1 ADJUSTABLE 5K
- RA1: Resistor array
- 1
 - 2
 - 3 470K
 - 4
 - 5 47K
 - 6 68K
 - 7 100M
 - 8 403K

- Resistors:
- R1 7.5K $\pm 1\%$
 - R2 220K 5%
 - R3 470K 5%
 - R4 68K 5%
 - R10 820 Ω 5%

IC1: CA 3046 transistor array
 NPN 5 TRANSISTORS
 Q1 and Q 15VOLT V_{CE} breakdown

TH1 Thermistor 5K, AT 25°C?
 corrects oscillator trigger for Temp.?
 CONTROL TERMINAL

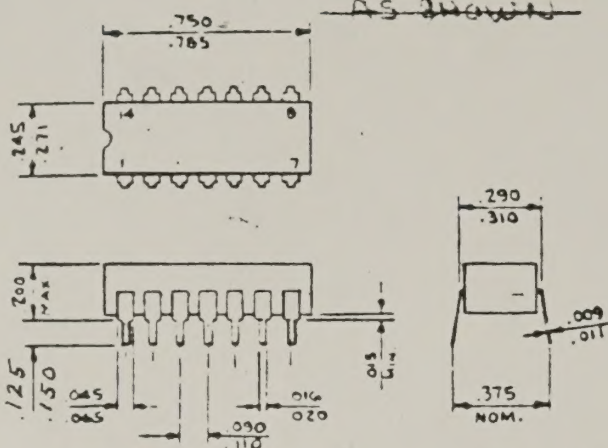
ELEMENTARY DIAGRAM E51 SWITCH SENSOR						
	APPROVAL	WIRING CHANGED		DRAWN D. DESJARDIN	5/11/78	ENGR. APP. <i>D. Van Zeland</i>
		INTERNAL	EXTERNAL			
A	DJD 8-22-78 EMK	X		CHECKED		5-25-78
B	DJD 10-6-78 EMK	X		SUP. NO.		5-25-78
C	DJD 11-7-78 EMK	X		SUP. BY NO.		CUTLER • HAMMER 244975 D2
D	DJD 1-29-79 JR	X		PANEL NO.		
E				BUL. NO.		
F				GROUP NO.		
G				ORDER NO. DV35-9284-10		

FILE AT H65

Digitized by the Internet Archive
in 2024 with funding from
Amateur Radio Digital Communications, Grant 151

<https://archive.org/details/currentmirrorcir00unse>

~~STAMP WITH~~
~~CH PART NO.~~
~~AS SHOWN~~

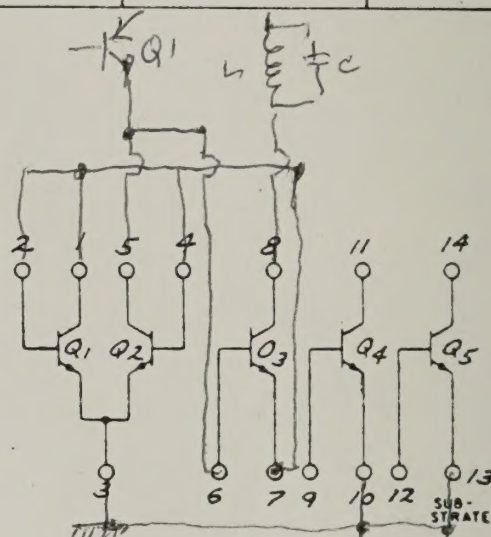


Power Dissipation:

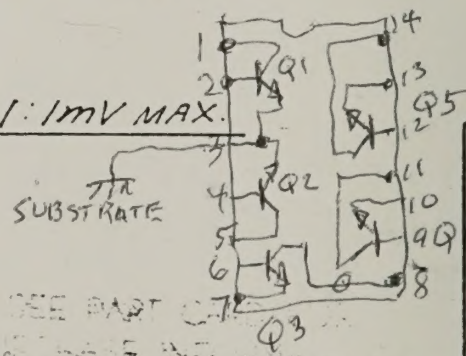
T_A up to 55°C	300	750	mW
$T_A > 55^\circ\text{C}$	Derate at 8.67		mW/°C
T_A up to 75°C	—	—	mW
$T_A > 75^\circ\text{C}$	—	—	mW/°C
Collector-to-Emitter Voltage, V_{CE0}	15	—	V
Collector-to-Base Voltage, V_{CBO}	20	—	V
Collector-to-Substrate Voltage, V_{CISO}	20	—	V
Emitter-to Base Voltage, V_{EBO}	5	—	V
Temperature Range:			
Operating	-55 to +125		°C
Storage	-65 to +150		°C
Lead Temperature (During Soldering):			
At distance 1/16 ± 1/32" (1.59 ± 0.79 mm) from case for 10 seconds max.	+265		°C

Characteristics apply for each transistor

CHARACTERISTICS	SYMBOLS	SPECIAL TEST CONDITIONS	LIMITS			UNITS
			34-911			
			MIN.	TYP.	MAX.	
STATIC CHARACTERISTICS						
Collector-to-Base Breakdown Voltage	V_{BRXCBO}	$I_C = 10 \mu A, I_E = 0$	20	60	-	V
Collector-to-Emitter Breakdown Voltage	V_{BRXCEO}	$I_C = 1 mA, I_D = 0$	15	24	-	V
Collector-to-Substrate Breakdown Voltage	V_{BRXCIO}	$I_C = 10 \mu A, I_{C1} = 0$	20	60	-	V
Emitter-to-Base Breakdown Voltage	V_{BREXBO}	$I_E = 10 \mu A, I_C = 0$	5	7	-	V
Collector-Cutoff Current	I_{CBO}	$V_{CB} = 10 V, I_E = 0$	-	0.002	40	nA
Collector-Cutoff Current	I_{CEO}	$V_{CE} = 10 V, I_B = 0$	-	-	0.5	μA
Static Forward Current-Transfer Ratio (Static Beta)	h_{FE}	$V_{CE} = 3 V, \begin{cases} I_C = 10 mA \\ I_C = 1 mA \\ I_C = 10 \mu A \end{cases}$	- 40 -	100 100 54	- - -	- - -
Input Offset Current for Matched Pair $(Q_1 \text{ and } Q_2) I_{O1} - I_{O2} $		$V_{CE} = 3 V, I_C = 1 mA$	-	0.3	2	μA
Base-to-Emitter Voltage	V_{BE}	$V_{CE} = 3 V, \begin{cases} I_E = 1 mA \\ I_E = 10 mA \end{cases}$	- -	0.715 0.800	- -	V
Magnitude of Input Offset Voltage for Differ- ential Pair $ V_{BE1} - V_{BE2} $		$V_{CE} = 3 V, I_C = 1 mA$	-	0.45	SEE NOTE 1	mV
Magnitude of Input Offset Voltage for Iso- lated Transistors $ V_{BE3} - V_{BE4} $ $ V_{BE4} - V_{BE5} , V_{BE5} - V_{BE3} $		$V_{CE} = 3 V, I_C = 1 mA$	-	0.45	5	mV
Temperature Coefficient of Base-to-Emitter Voltage	$\frac{\Delta V_{BE}}{\Delta T}$	$V_{CE} = 3 V, I_C = 1 mA$	-	-1.9	-	mV/°C
Collector-to-Emitter Saturation Voltage	V_{CES}	$I_B = 1 mA, I_C = 10 mA$	-	0.23	-	V
Temperature Coefficient Magnitude of Input-Offset Voltage	$\frac{ \Delta V_{IO} }{\Delta T}$	$V_{CE} = 3 V, I_C = 1 mA$	-	1.1	-	$\mu V/°C$



SCHEMATIC
CA 3046 NPN



NOTE 1: 1mV MAX

ππ
SUBSTRATE

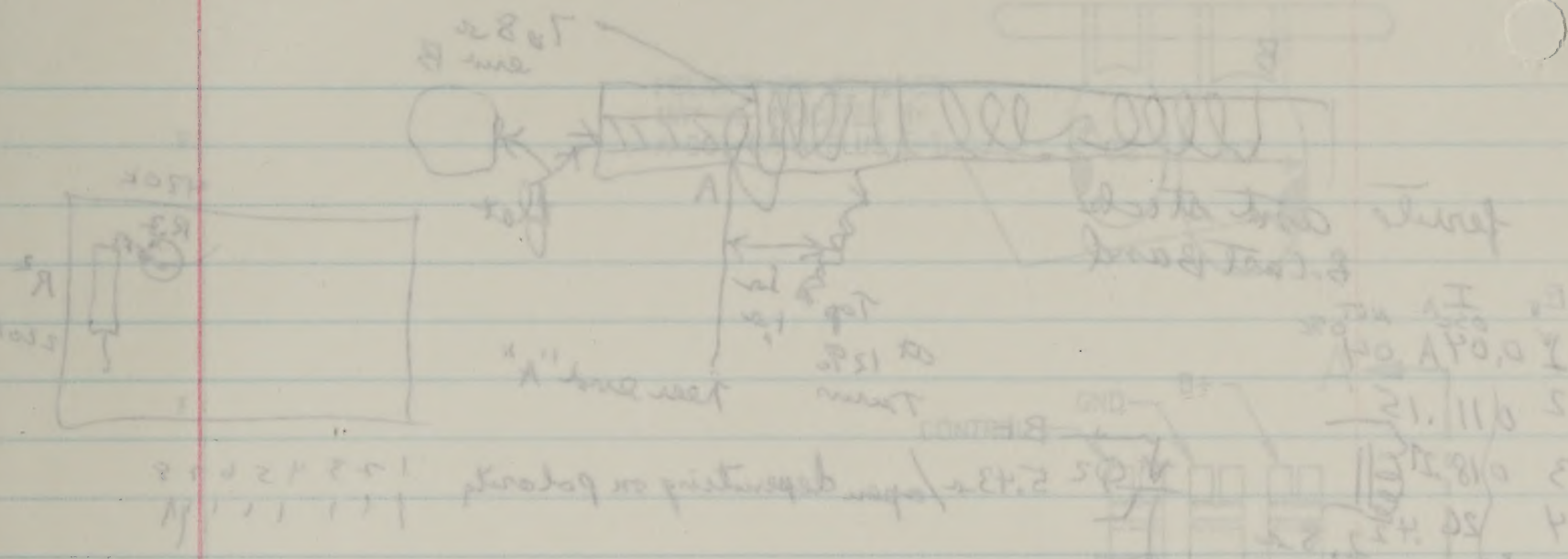
SEE PAGE 12

... .. 4)

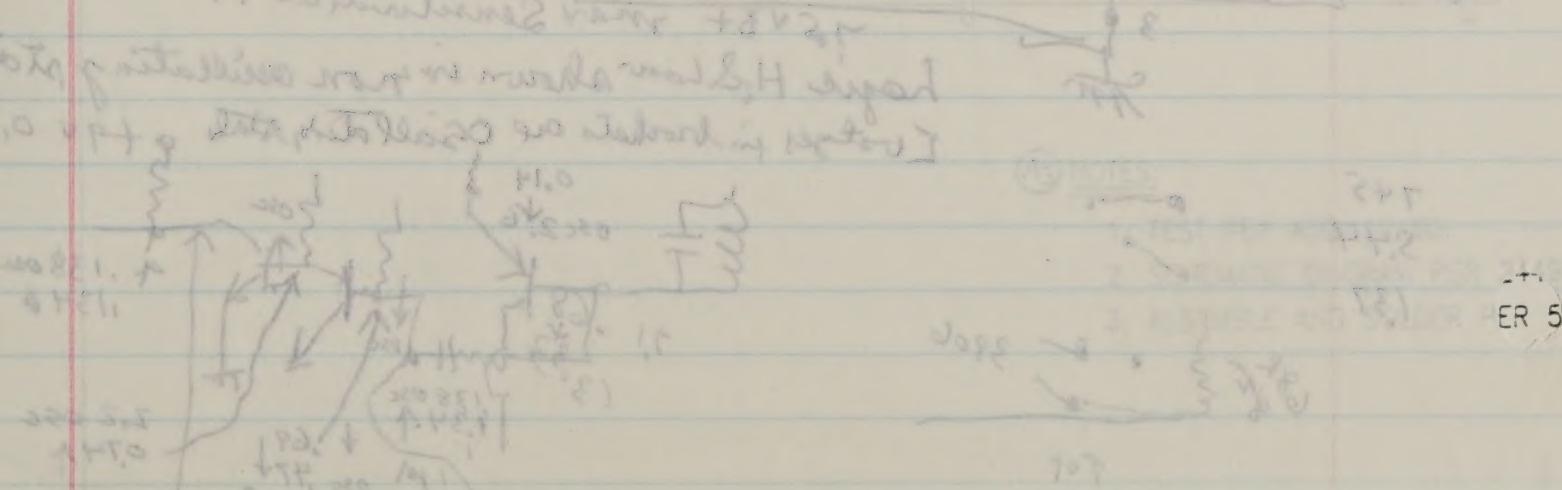
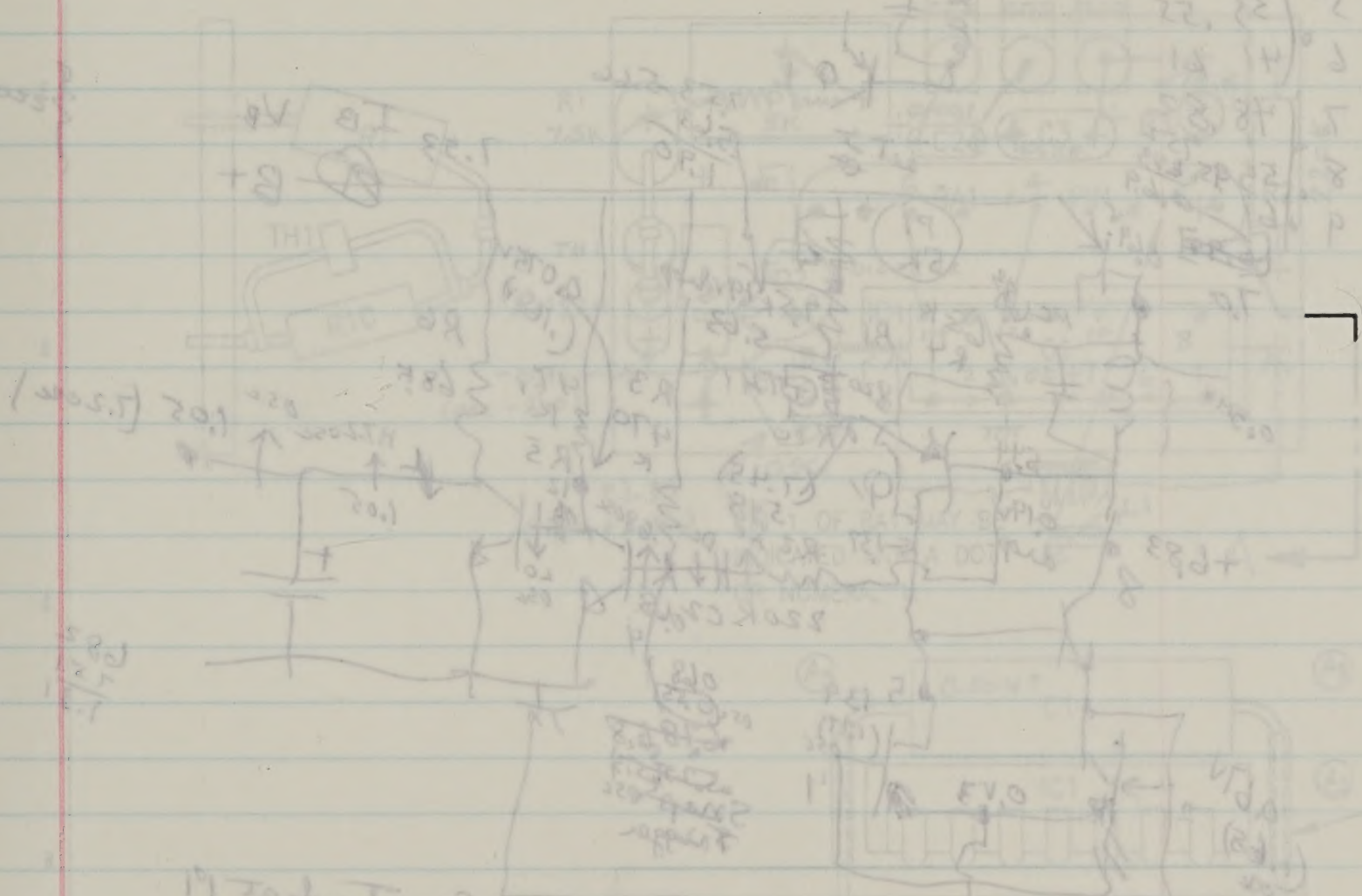
ORDER NO. DV35-9284-10		BASIC SPECS. SUMMARY		DESCR.	
TITLE INTEGRATED CIRCUIT TRANSISTOR ARRAY (CA3046)				RAW PART NO.	
ADDED STAMP NOTE.		NPN		SPEC.	
CROSSED OFF NOTE		DM35-3200-10		SCALE	
DO NOT SCALE DRAWING. WORK ACCORDING TO DIMENSIONS.		REQUIREMENTS OF 50-2800 SHALL APPLY TO THIS DRAWING UNLESS OTHERWISE SPECIFIED.		SURFACE COATING	
DIMENSIONS BEFORE COATING ARE SPECIFIED - ALLOWANCES HAVE BEEN MADE FOR COATINGS EXCEPT ON THREADS.		DR. J. LAZZARO		FIRST ASSEM. WHERE LISTED	
CHK. E. Kuntz		5/18/78		SUP'S	
APP. D. Desjardins		3-3		NON-INTERCHANGEABLE	
CUTLER • HAMMER		78		SUP'D BY	
				NON-INTERCHANGEABLE	

34-911

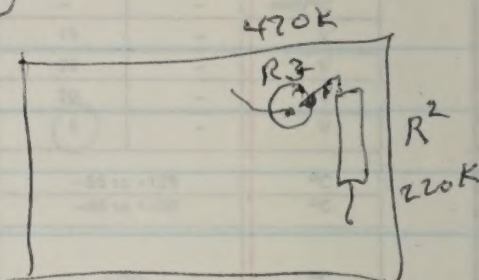
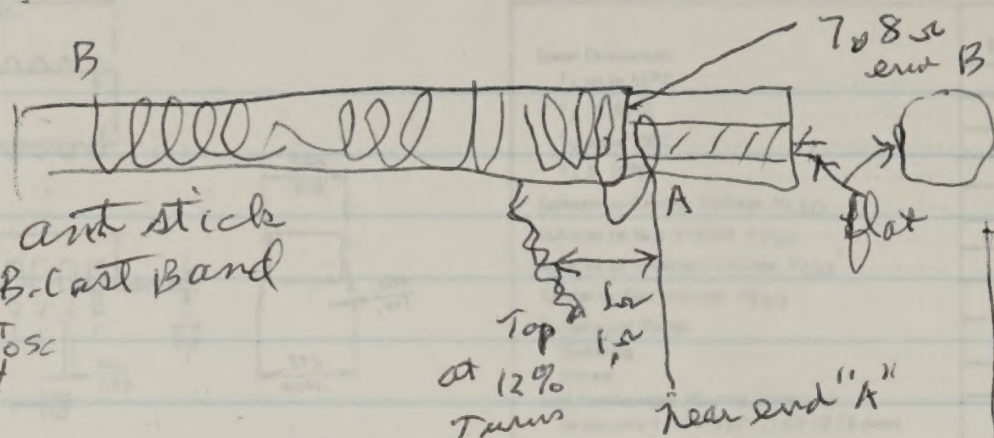
Current Mirror Circuit
 C-44 Proximity Sensor
 8-9-91



1.5V 1.2V 1.1V 1.0V 0.9V 0.8V 0.7V 0.6V 0.5V 0.4V 0.3V 0.2V 0.1V 0V



Current Mirror Oscillator
C-H's proximity Sensor 3-9-91

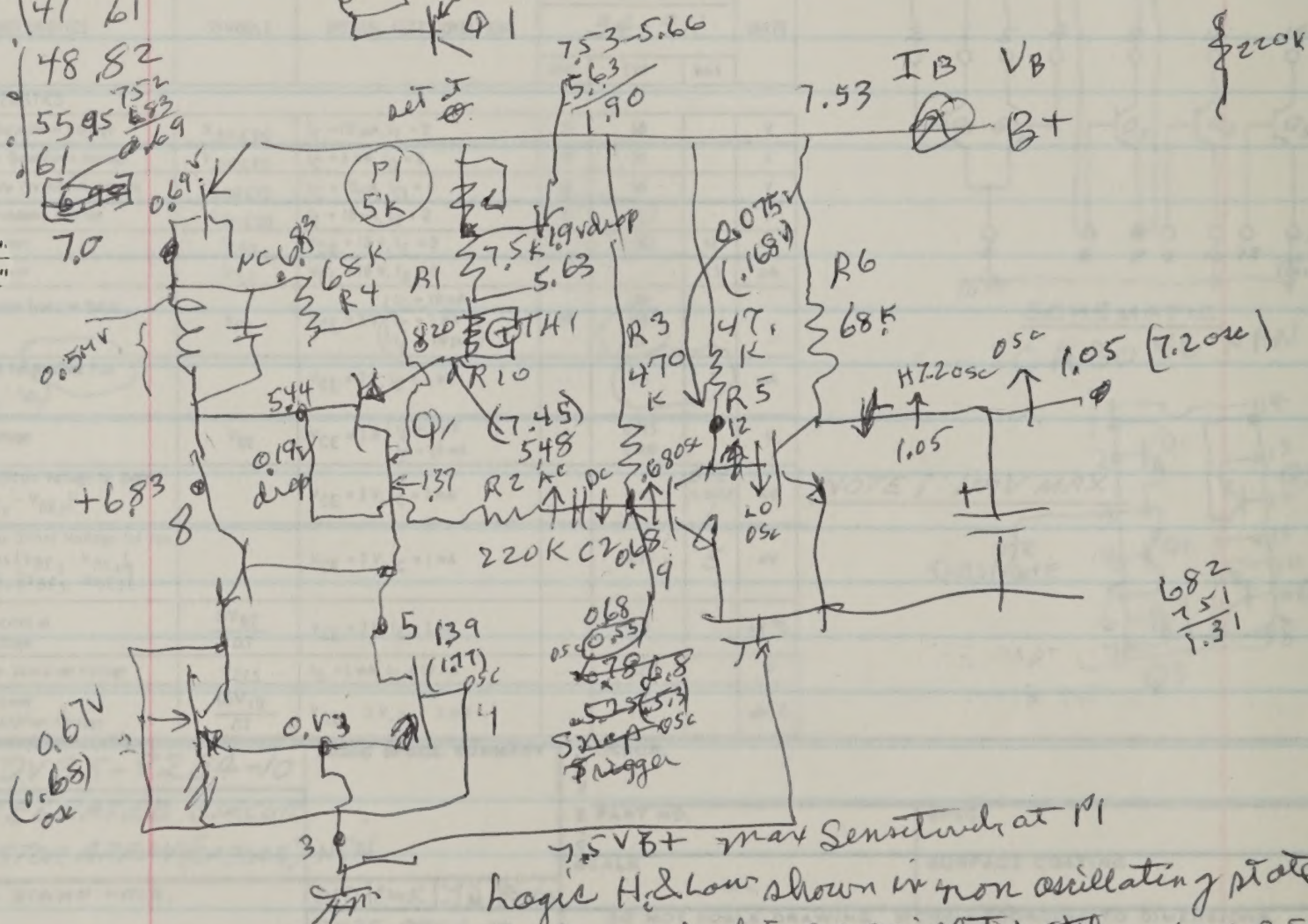


E_V I_A NOT
 OSC OSC
 I 0.04A 04

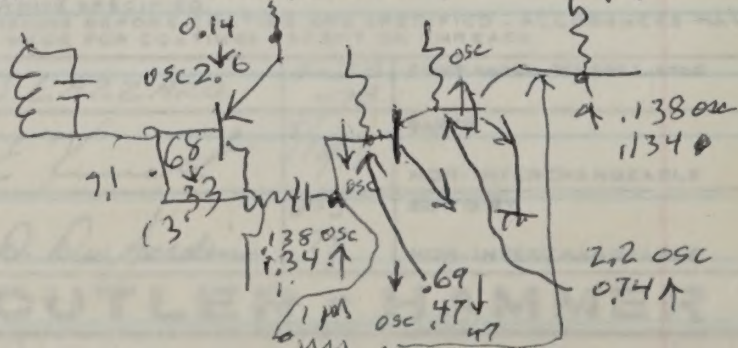
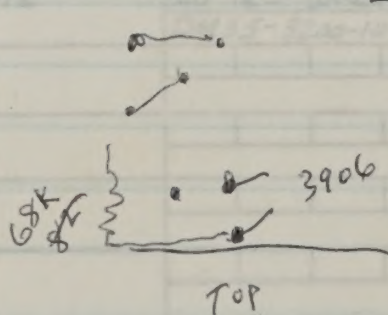
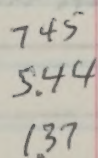
2 0 11.15
3 0 18.25
4 26.42 2.82
5 33.55
6 41 61
7 48.82
8 55.95 752
9 61 693
10 67 191

$\frac{\sqrt{Q^2}}{\pi}$ 5.43 ω / open depending on polarity

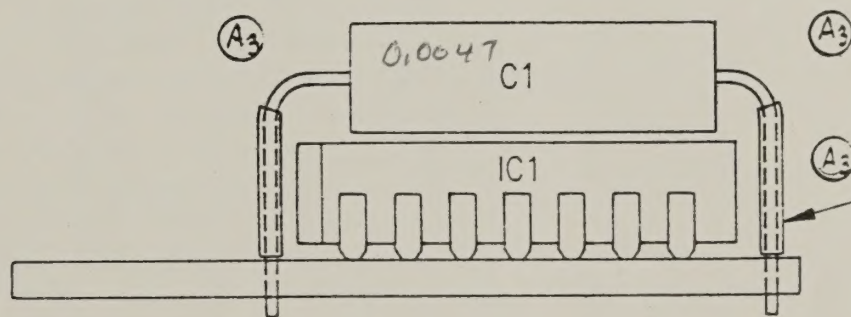
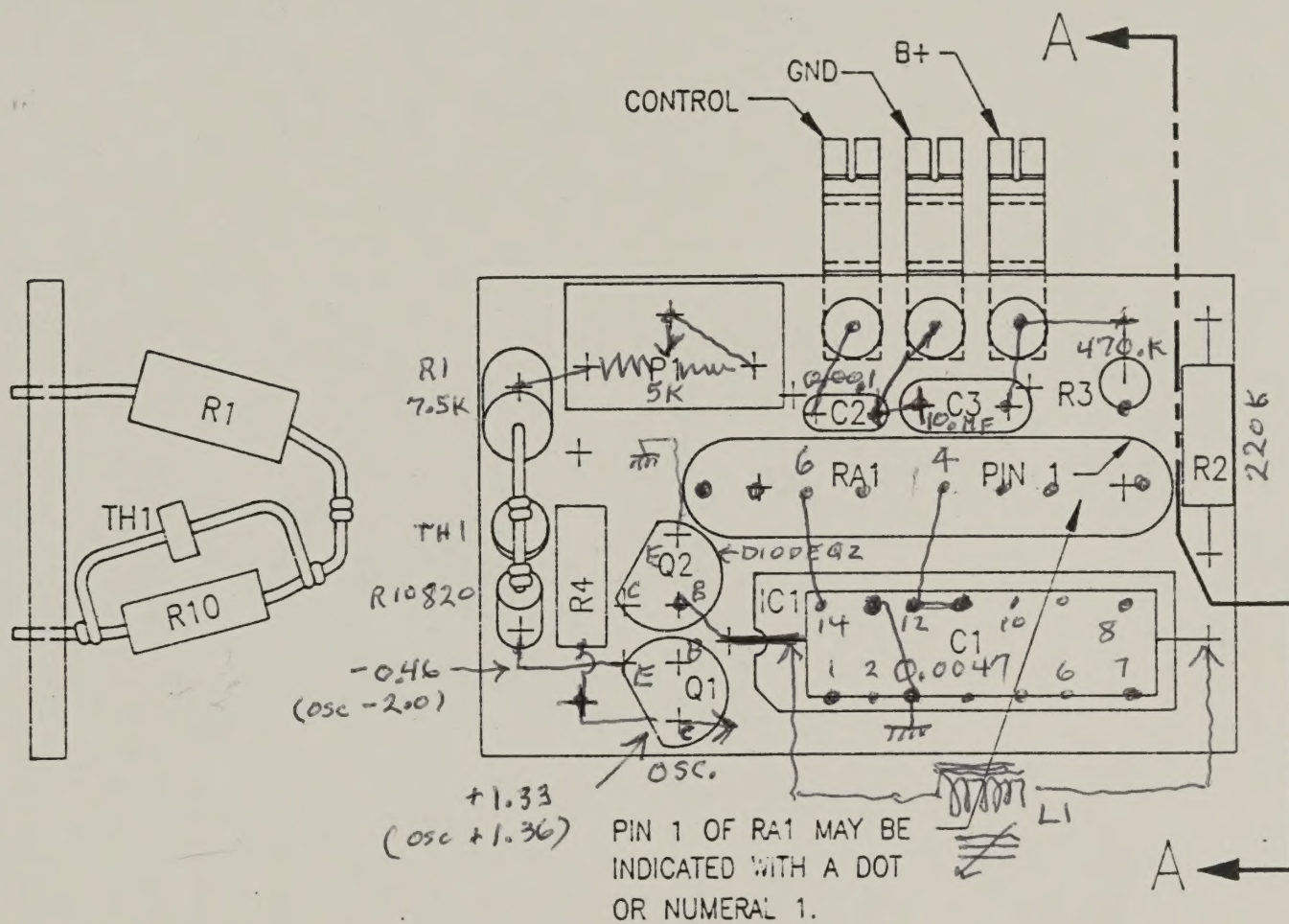
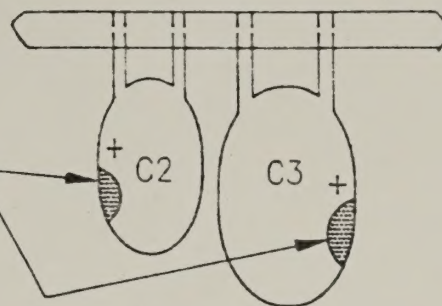
1 2 3 4 5 6 7 8
1 1 1 1 1 1 1 1



Logic H₂ & Low shown in non oscillating state
 Voltages in brackets are oscillating state $f = 900.5 \text{ MHz}$



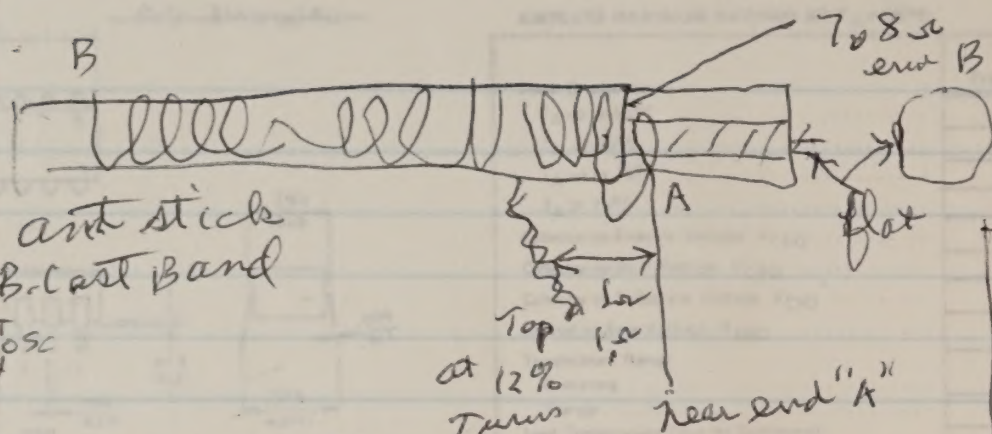
POLARITY ON C2 & C3
MAY BE INDICATED BY
A DOT OR A PLUS (+)



NOTES:

1. TEST PER A50-10160.
2. SCHEMATIC DIAGRAM PER 244975D2.
3. ASSEMBLE AND SOLDER PER 50-5376.

Current Mirror Oscillator
C-H's proximity Sensor 3-9-91



ferrets ant stick
B. cast Band

E_v I_{osc} NOT OSC
 I_v 0.04A 04

2 011.15

3 0) 18.29

$$4 \overline{) 26.42782}$$

5' 33.55"

$$6^0 \mid 41 \mid 61$$

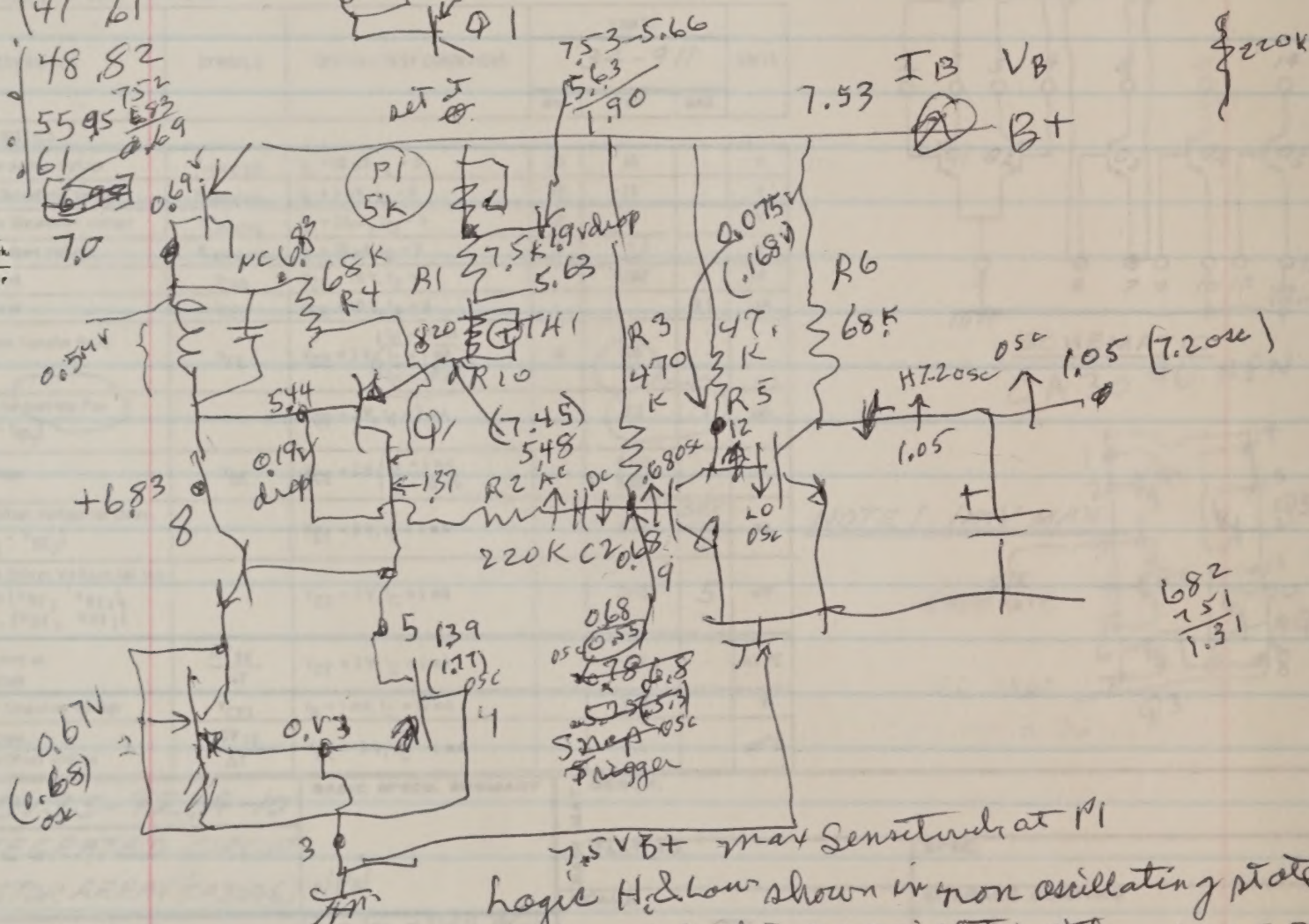
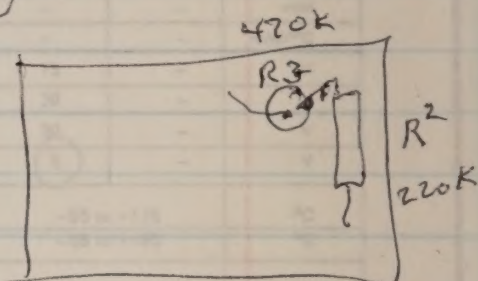
7 | 48,82

8. 5595 $\frac{1293}{210}$

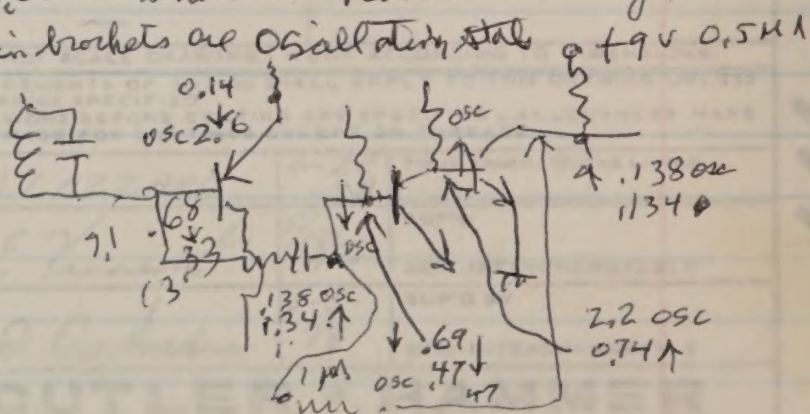
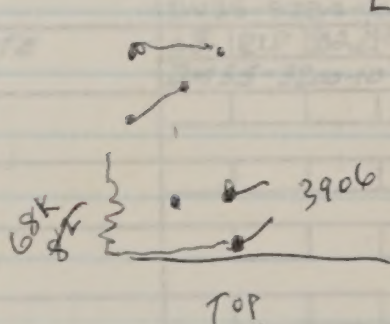
9 61 5

Φ_2 5.43 μ / open depending on polarity

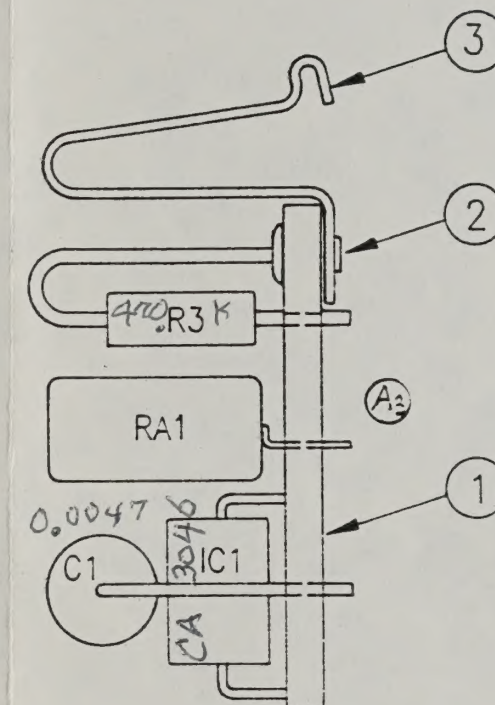
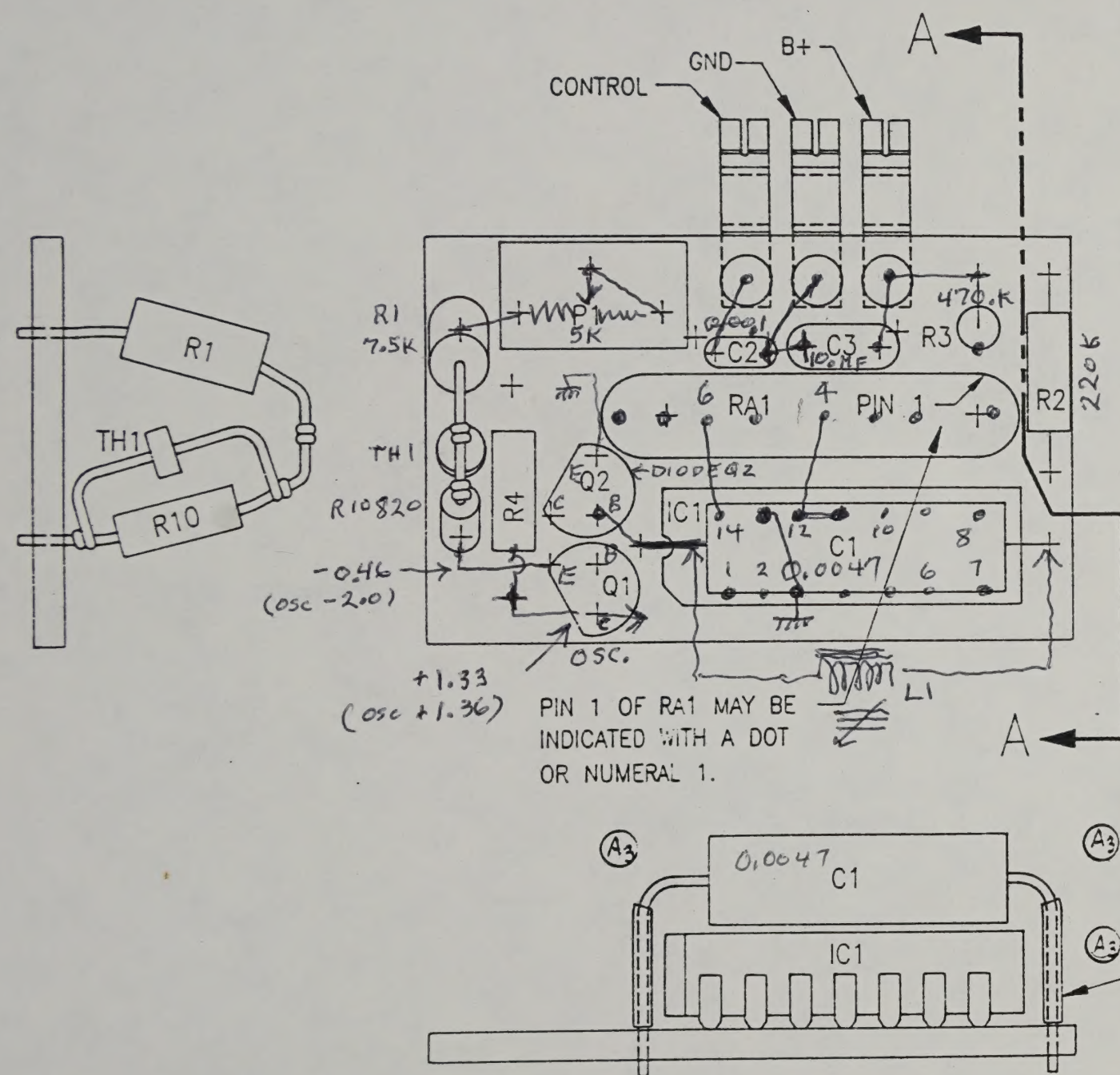
1 2 3 4 5 6 7 8
1 1 1 1 1 1 1 1



Logic H₂ & Low shown in non oscillating state
[Voltages in brackets are oscillating state] $f = 90.5 \text{ MHz}$



POLARITY ON C2 & C3
MAY BE INDICATED BY
A DOT OR A PLUS (+)



VIEW A-A

NOTES:

1. TEST PER A50-10160.
2. SCHEMATIC DIAGRAM PER 24497502.
3. ASSEMBLE AND SOLDER PER 50-5376.

REV.	DESCRIPTION	APPROV.
A3	REDRAWN & REVISED - WAS "B" SIZE. REMOVED "LOOPED LEADS" FROM "C1" FRONT VIEW & RELATED NOTES. FRONT VIEW "IC1" WAS LABELED "RA1". ADDED "RA1" TO VIEW A-A. NUMBERED EXISTING NOTES. IRENE B. MANN 8-6-90 DW35-3250 (A4305)	ARD 8.17 90

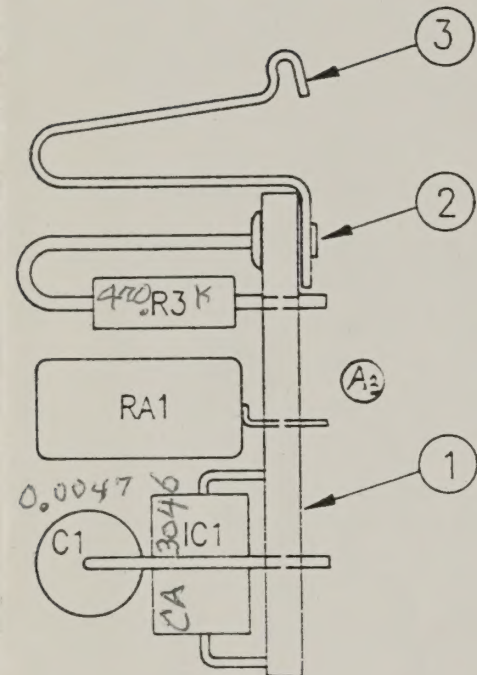
QTY	DWG. NO./PART NO.	ITEM	DESCRIPTION
1	A 81-14446	1	DRILLED BOARD
3	A 12-1245-2	2	RIVET (EYELET)
3	A 23-5233	3	CONTACT SPRING
1	B 57-3036-135	4	R1 RESISTOR 7.5K ±1%
1	B 57-1924-53	5	R2 RESISTOR 220K ±5%
1	B 57-1924-57	6	R3 RESISTOR 470K ±5%
1	B 57-1924-47	7	R4 RESISTOR 68K ±5%
1	B 57-1924-24	8	R10 RESISTOR 820Ω ±5%
1	B 59-119	9	RA1 RESISTOR ARRAY
1	A 42-3197	10	C1 CAPACITOR .0047 100V
1	B 34-1060-51	11	C2 CAPACITOR .1μf 35V
1	B 34-1060-47	12	C3 CAPACITOR 10μf 25V
2	A 35-432	13	Q1, Q2 TRANSISTOR 2N3906
1	A 34-911	14	IC1 TRANSISTOR ARRAY
1	B 57-1305-2	15	TH1 THERMISTOR 5K
1	A 57-3365	16	P1 POTENTIOMETER 5K
2	CUT FROM 4602-68	17	TUBING
		18	
		19	
		20	
		21	
		22	
		23	
		24	

RAW MAT'L	DWG. NO./PART NO.	ITEM	DESCRIPTION
MATL SPEC. OR MATL NO.	58-5117		PCB ASSEMBLY
REQUIREMENTS OF 88-2800 SHALL APPLY TO THIS DRAWING UNLESS OTHERWISE SPECIFIED. DIMENSIONS BEFORE COATING ARE SPECIFIED UNLESS OTHERWISE SPECIFIED. ALLOWANCES HAVE BEEN MADE FOR COATING EXCEPT ON THREADS.	ORDER NO. DV35-9284-10		CUTLER-HAMMER
TOLERANCES -- INCHES UNLESS OTHERWISE SPECIFIED	SCALE 4:1		ASHEVILLE, N. C.
JXXX ±.002 JXXX ±.008 JX ±.010 ANGULAR ±°	DR. J. LAZZARO	5-8-78	TITLE PCB ASSEMBLY FOR E51 PROXIMITY SENSOR -
TOLERANCES -- MILLIMETERS UNLESS OTHERWISE SPECIFIED	CHK. E. KUNATH	5-18-78	
JXXX ±.005 JXXX ±.015 JX ±.025 ANGULAR ±°	APPROV. D. DESJARDIN	5-30-78	C 58-5117

TRACING IN ASHEVILLE

ORIGINAL TRACING IN PATENT FILE

REV.	DESCRIPTION	APPROV.
A3	REDRAWN & REVISED - WAS "B" SIZE. REMOVED "LOOPED LEADS" FROM "C1" FRONT VIEW & RELATED NOTES. FRONT VIEW "IC1" WAS LABELED "RA1". ADDED "RA1" TO VIEW A-A. NUMBERED EXISTING NOTES. IRENE B. MANN 8-6-90 DM35-3250 (M305)	AKD S17 90



VIEW A-A

QTY	DWG. NO./PART NO	ITEM	DESCRIPTION
1	A 81-14446	1	DRILLED BOARD
3	A 12-1245-2	2	RIVET (EYELET)
3	A 23-5233	3	CONTACT SPRING
1	B 57-3036-135	4	R1 RESISTOR 7.5K $\pm 1\%$
1	B 57-1924-53	5	R2 RESISTOR 220K $\pm 5\%$
1	B 57-1924-57	6	R3 RESISTOR 470K $\pm 5\%$
1	B 57-1924-47	7	R4 RESISTOR 68K $\pm 5\%$
1	B 57-1924-24	8	R10 RESISTOR 820 Ω $\pm 5\%$
1	B 59-119	9	RA1 RESISTOR ARRAY
1	A 42-3197	10	C1 CAPACITOR .0047 100V
1	B 34-1060-51	11	C2 CAPACITOR .1 μf 35V
1	B 34-1060-47	12	C3 CAPACITOR 10 μf 25V
2	A 35-432	13	Q1, Q2 TRANSISTOR 2N3906
1	A 34-911	14	IC1 TRANSISTOR ARRAY
1	B 57-1305-2	15	TH1 THERMISTOR 5K
1	A 57-3365	16	P1 POTENTIOMETER 5K
2	CUT FROM 4602-68	17	TUBING
		18	
		19	
		20	
		21	
		22	
		23	
		24	

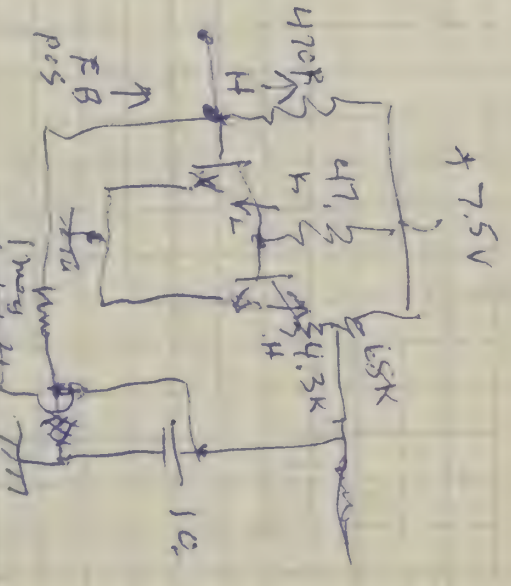
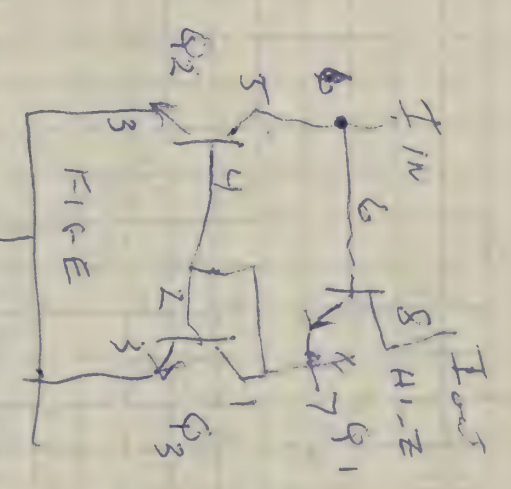
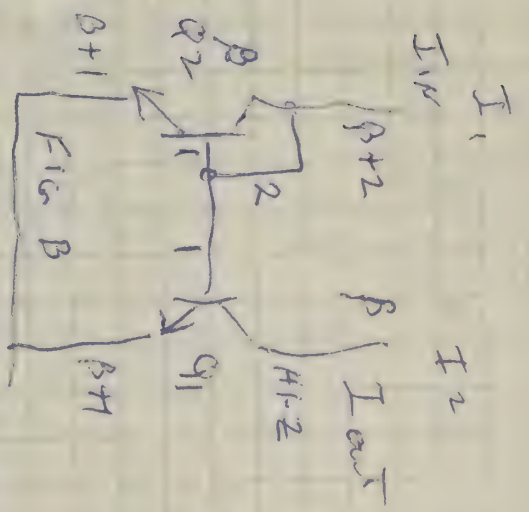
CA 3046

ING CUT TO
LONG $\pm .08$

RAW MAT'L		DWG. NO. PART NO.		DESCRIPTION																				
MATERIAL SPEC. OR MATERIAL NO.		ITEM																						
REQUIREMENTS OF 90-2500 SHALL APPLY TO THIS DRAWING UNLESS OTHERWISE SPECIFIED. DIMENSIONS BEFORE COATING ARE SPECIFIED - ALLOWANCES HAVE BEEN MADE FOR COATING EXCEPT ON THREADS.		ORDER NO. DV35-9284-10		CUTLER-HAMMER																				
TOLERANCES -- INCHES UNLESS OTHERWISE SPECIFIED		NEXT ASSY.		ASHEVILLE, N. C.																				
TOLERANCES -- MILLIMETERS UNLESS OTHERWISE SPECIFIED		SCALE 4:1 (A3)		TITLE PCB ASSEMBLY FOR E51 PROXIMITY SENSOR -																				
<table border="1"> <tr> <td>XXX</td> <td>XXX</td> <td>XX</td> <td>ANGULAR</td> </tr> <tr> <td>$\pm .002$</td> <td>$\pm .006$</td> <td>$\pm .010$</td> <td>\pm</td> </tr> </table>		XXX	XXX	XX	ANGULAR	$\pm .002$	$\pm .006$	$\pm .010$	\pm	<table border="1"> <tr> <td>DR.</td> <td>J. LAZZARO</td> <td>5-8-78</td> </tr> <tr> <td>CHK.</td> <td>E. KUNATH</td> <td>5-18-78</td> </tr> <tr> <td>APPROV.</td> <td>D. DESJARDIN</td> <td>5-30-78</td> </tr> </table>		DR.	J. LAZZARO	5-8-78	CHK.	E. KUNATH	5-18-78	APPROV.	D. DESJARDIN	5-30-78	<table border="1"> <tr> <td>ITEM</td> <td>58-5117</td> </tr> </table>		ITEM	58-5117
XXX	XXX	XX	ANGULAR																					
$\pm .002$	$\pm .006$	$\pm .010$	\pm																					
DR.	J. LAZZARO	5-8-78																						
CHK.	E. KUNATH	5-18-78																						
APPROV.	D. DESJARDIN	5-30-78																						
ITEM	58-5117																							

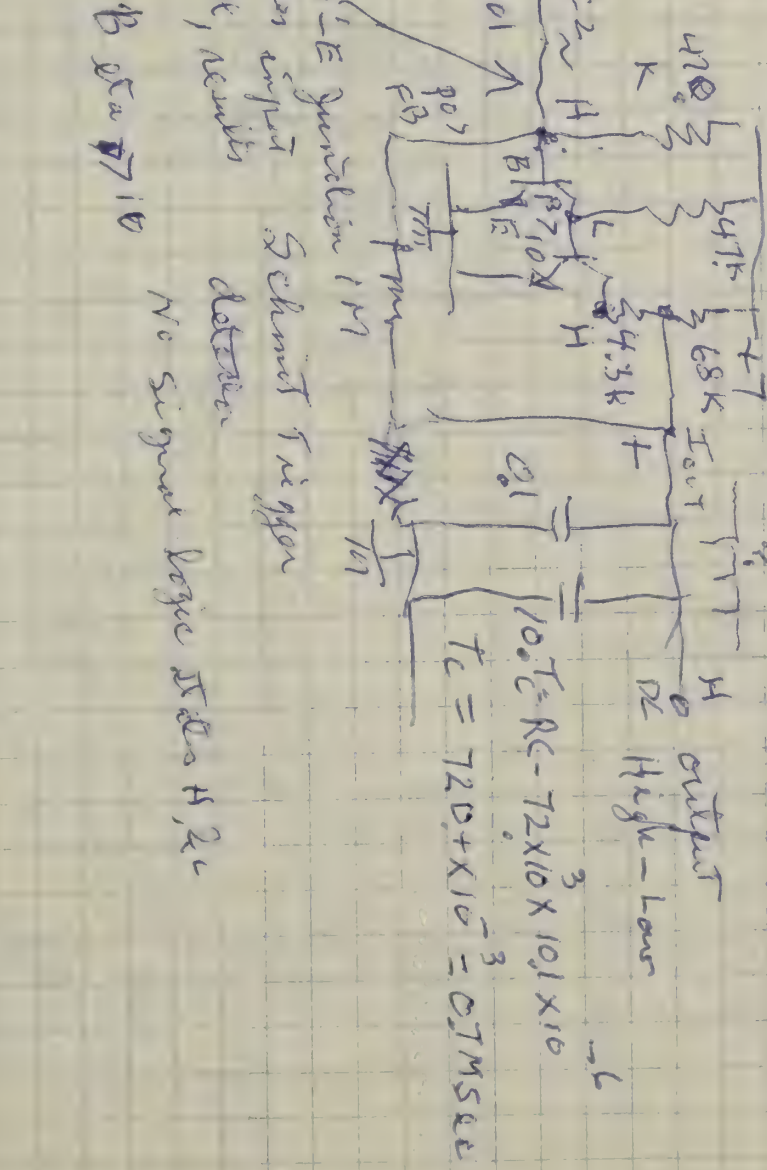
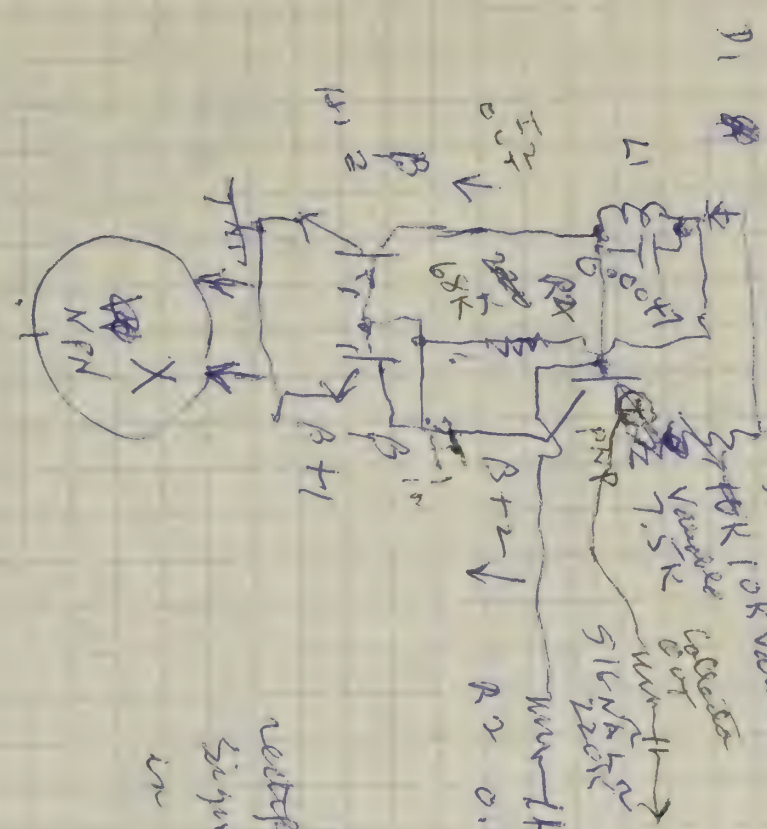
TRACING IN ASHEVILLE

ORIGINAL TRACING IN PATENT FILE



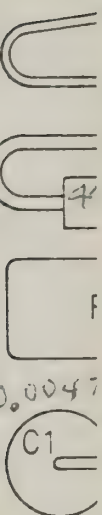
Part of RCA CA 3046

CH 244 975 D2 RCA 7012 linear switches p544

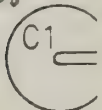


negative input Schmitt trigger
signal, needs detector
in B data 10 No signal logic 1000 Hz

$$T_c = 720 \times 10^{-3} = 0.72 \text{ msec}$$



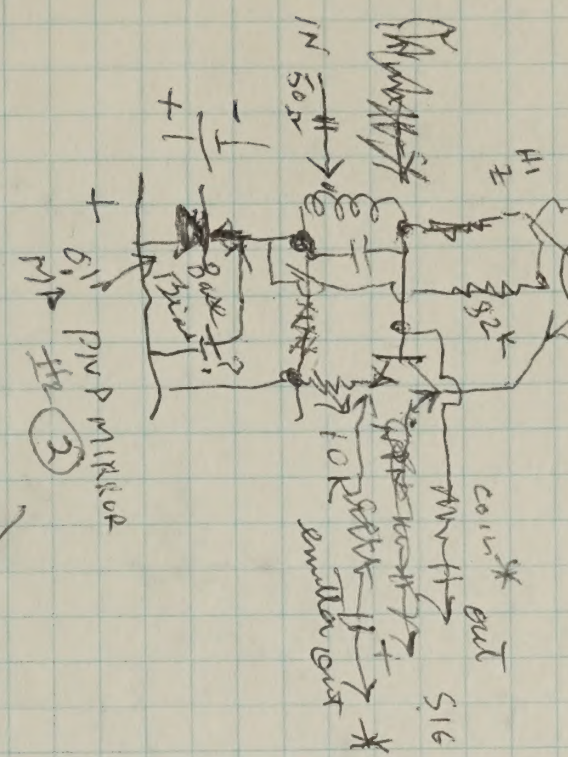
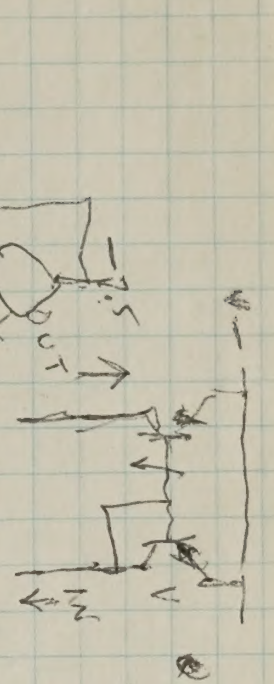
0.0047



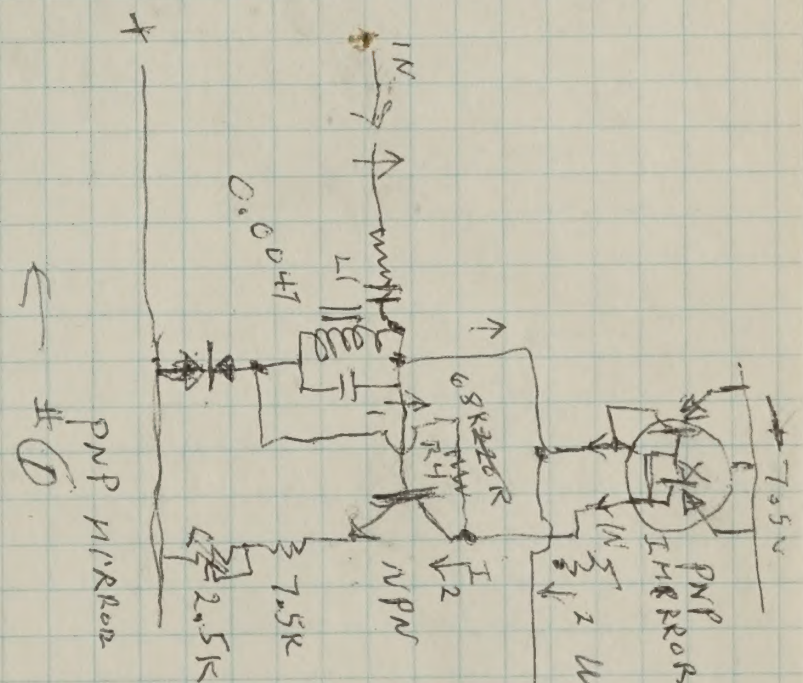
ING CUT
LONG ±

FRONT VIEW

10 in 1/4

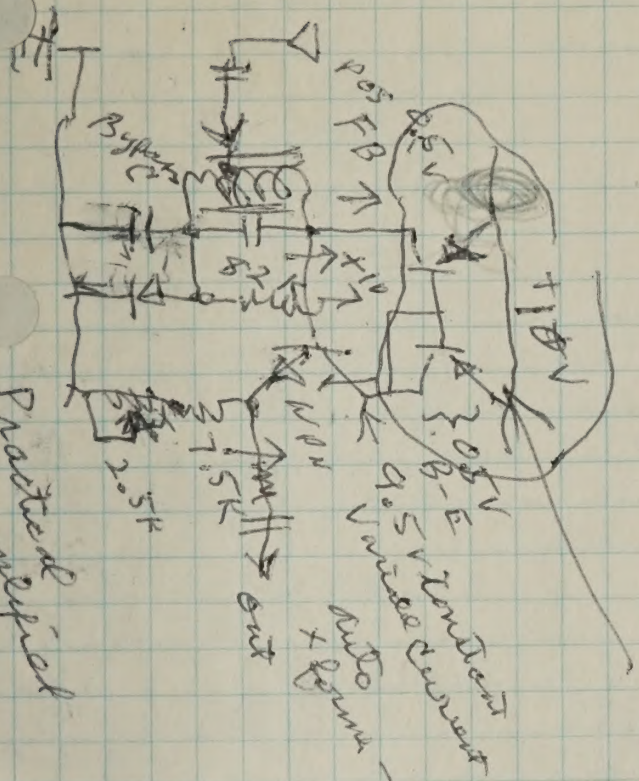
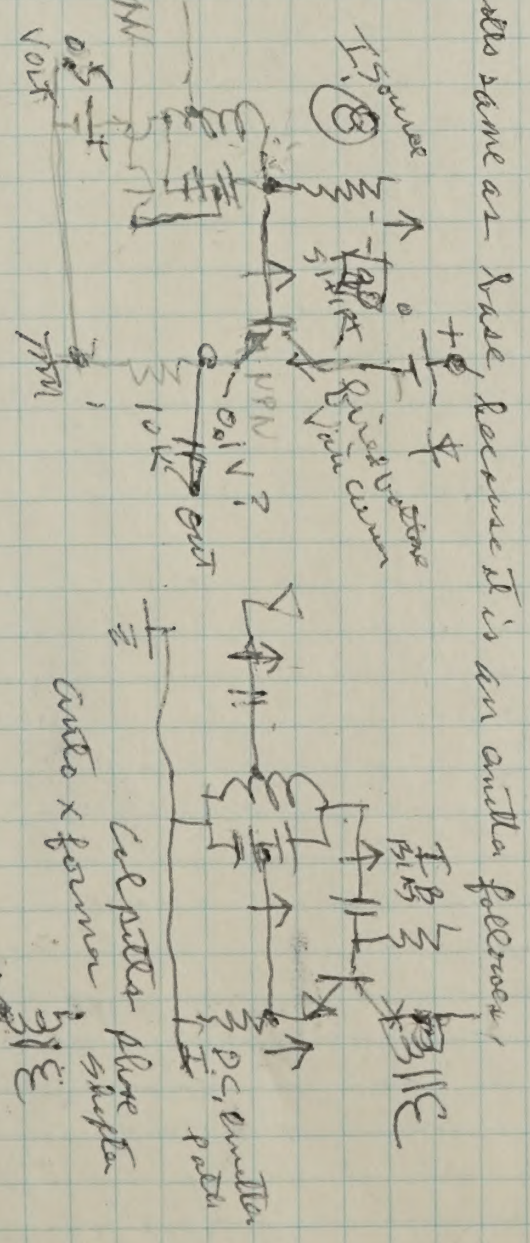
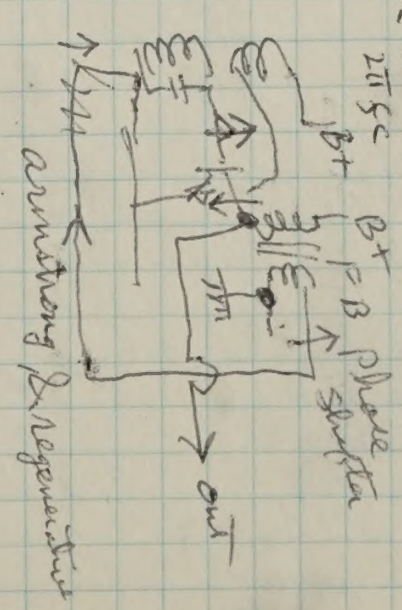


* ~~Don't get AC signal~~
 * emitter AC signal output

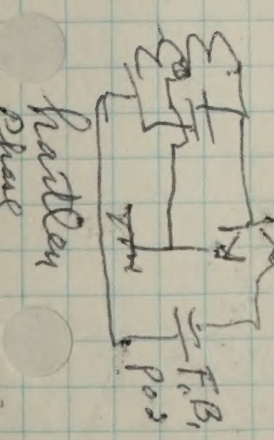


3-9-91
 Negative
 Radio
 using current mirror feedback
 220k β ≈ 100
 out phase shift

$$X_c = \frac{1}{2\pi f C} = \frac{1}{2\pi \times 10^3 \times 10^{-9}} = 79.6 \Omega$$



Practical



Practical

